Protein degradation. Photoactivatable.
Our Idea
Light induction
Protein degradation
Killswitch
Protein degradation

tag
ssrA

adaptor
SspB

protease
ClpXP
Adaptor split

J. Davis et al, ACS Chem. Biol. 2011
Adaptor split

core

XB

protease

J. Davis et al, ACS Chem. Biol. 2011
Light inducible dimerisation

core

XB

protease
Light induction
Light induction

Lungu et al, Chemistry & Biology, 2012
Light induction

Lungu et al, Chemistry & Biology, 2012
Light induction

LOV

Lungu et al, Chemistry & Biology, 2012
Light induction

Lungu et al, Chemistry & Biology, 2012
Light induction

core

LOV

XB

protease
Light induction

LOV

core

XB

protease
Light induction

- protein
- LOV
- core
- XB
- protease
Light induction

LOV → core → XB → protease
Proof of Principle

mCherry

tag

mCherry-ssrA

IPTG [mM]

0 0.2 1
Killswitch

- IPTG  + IPTG

31 colonies  0
Outlook

mCherry

tag

[Diagram of a red circle, a blue image, and a white tag]
## Biobricks

<table>
<thead>
<tr>
<th>Basic constructs</th>
<th>Additional systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>mCherry-ssrA</td>
<td>light inducible expression system</td>
</tr>
<tr>
<td>mCherry</td>
<td>inducible SspB Split system</td>
</tr>
<tr>
<td></td>
<td><strong>Killswitch</strong></td>
</tr>
<tr>
<td>ccdB</td>
<td><strong>Light inducible degradation</strong></td>
</tr>
<tr>
<td>ccdA-ssrA</td>
<td>SspB[Core]-LOV-ipaA</td>
</tr>
<tr>
<td>mazF</td>
<td>VinD1-sspB[XB]</td>
</tr>
<tr>
<td>mazE-ssrA</td>
<td></td>
</tr>
</tbody>
</table>
Future of protein degradation

- Protein of interest
- Ease of use
  - Fast
- Non invasive
  - Transferrable
Human Practice

- Online game
- Science Slam
- Comic
- School visits
- Conferences
- Information booth
Online game

Score: 7802
Next upgrade at 8000 Points

Energy
Science Slam
School visits
Conferences

1. Biocom, Berlin
2. PhD student convention, Düsseldorf
Information booth
Evaluation

Before: Are you familiar with synthetic biology?

After: Are you familiar with synthetic biology?
Remember those DNA plasmids I told you about? Darth Cherry, in his hunger for power, accidentally took up a plasmid that makes him sensitive to blue light. And so, with only a beam of blue light, all his clones can be rendered useless.

Now to you guys. What are you doing here in this colony?
Acknowledgements

special thanks to

- University of Bonn and LIMES Institute
- Andreas Möglich, Humbold University Berlin
- Bernd Bukau, IZMB University of Heidelberg
- Peter Chien, MIT
- Robert Sauer, MIT
- Maria Creuzberg

our collaborators

- NRP UEA Norwich
From Bonn with LOV